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I.—*Additions to the Cryptozoic Fauna of New Zealand.*

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HAVING for the last six years devoted a considerable amount of time to the study of the cryptozoic \* fauna of Australia, and especially of the Land-Planarians, the Nemertine *Geonemertes*, and *Peripatus*, which are so frequently found beneath logs and stones in the Australian bush, I have naturally turned my attention to the same groups of animals since my arrival in New Zealand at the beginning of this year.

The cryptozoic animals of New Zealand have certainly not received the attention which they deserve, and they still offer an almost untouched and very promising field for investigation to local naturalists.

The New Zealand *Peripatus*, indeed (*P. novæ-zealandiæ*, Hutton), has escaped the general neglect, having been the subject of an important memoir by Captain F. W. Hutton, F.R.S., published in the Ann. & Mag. of Nat. Hist. for November 1876; while Miss Sheldon has since published various observations on its anatomy and development in the Qu. Jour. of Micr. Sci.

None but the ordinary thirty-legged form has, however, as yet been recorded. In the present paper I shall have to note

\* I proposed this term some years ago for the curious assemblage of animals, commonly found beneath logs and stones and in similar situations (*vide* 'Victorian Naturalist,' December 1889).

the occurrence of a form with sixteen pairs of legs instead of fifteen.

Of Land-Planarians only three species have as yet been described from New Zealand! The first was Moseley's *Geoplana Traversii*, received from Mr. Travers when H.M.S. 'Challenger' was at Wellington, and described by Professor Moseley in the Qu. Jour. of Micr. Sci.

In the Trans. New Zeal. Inst. for 1880 Captain Hutton described two more species from Dunedin and Wellington, which he named *Geoplana Moseleyi* and *Rhynchodemus testaceus* respectively. The latter, however, proves to be also a *Geoplana*.

The Land-Planarian fauna of New Zealand promises to be exceedingly rich, and I am already able to add thirteen species to the above list, four of which were found in my own garden at Christchurch, while for others I am indebted to the kindness of many friends who have interested themselves in the matter on my behalf. The additions include a *Rhynchodemus* and a *Bipalium*. The latter, however, is almost certainly introduced, and possibly also the former, the specimens of which appear to be identical with an Australian species. The majority of the species of Land-Planarians seem to be very closely related to Australian forms, but distinguishable by some slight difference in colour or pattern.

The most interesting addition to the cryptozoic fauna which I have to record, however, is an indigenous Land-Nemertine, quite distinct not only from the Australian species (*Geonemertes australiensis*, Dendy \*) but also from any other previously described form. This will be described in the sequel under the name of *Geonemertes novæ-zealandiæ*, and its discovery brings the total number of known terrestrial Nemertines up to six.

I will now give a list of the cryptozoic animals above referred to, together with information sufficient for identification of the new forms. Fuller details will, I hope, be published in the 'Transactions of the New Zealand Institute.'

#### *List of the Land-Planarians.*

##### 1. *Geoplana Traversii*, Moseley.

*Geoplana Traversii*, Moseley, Qu. Jour. Micr. Sci. vol. xvii. n. s. p. 284.

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\* A detailed account of *Geonemertes australiensis* is given in the 'Proceedings of the Royal Society of Victoria' for 1891.

2. *Geoplana Moseleyi*, Hutton.

*Geoplana Moseleyi*, Hutton, Trans. N. Z. Inst. vol. xii. 1880, p. 277.

3. *Geoplana testacea*, Hutton, sp.

*Rhynchodemus testaceus*, Hutton, Trans. N. Z. Inst. vol. xii. 1880, p. 277.

It appears to me almost certain that this species is identical with Moseley's *Geoplana sanguinea* from Australia, and that Fletcher and Hamilton's *G. rubicunda* and my own *G. alba*, from New South Wales and Victoria respectively, are also identical. I have received specimens from Auckland, and have collected it myself at Tarawera township in the centre of the North Island; while Captain Hutton records it from Dunedin and Wellington.

I have not seen any specimens without eyes, as in the original description, and I believe that they are always present, though not so evident as in other members of the genus. It must, however, be remembered that in the closely related Tasmanian *G. typhlops*\* the eyes appear to be certainly wanting.

4. *Geoplana triangulata*, sp. n.

This is a large species, commonly about 5 inches long when crawling and rather broad. In general form and habits it resembles *G. testacea*, to which it appears to be nearly related. It is, however, distinguished from that species by the presence of characteristic markings. There is a very broad band of a dark purplish-brown tint, occupying the middle two thirds or thereabouts of the dorsal surface. Outside this band the margins of the body are thin and translucent, and of a pale yellowish colour peppered with numerous minute specks of dark grey. The ventral surface is pale yellowish, thickly peppered with minute grey specks.

The name *triangulata* is given on account of the presence, under certain conditions, of a strongly-marked median dorsal ridge, a character also found in the Victorian *G. alba*.

This worm is very common in gardens about Christchurch. It feeds upon earthworms and is frequently dug up with the spade. It is also found under old wood &c. as usual.

A variety of this species occurs at Dunedin, characterized by the absence of the grey specks from the margins and ventral surface. A specimen of this variety in the Dunedin

\* Dendy, Proc. R. S. Victoria, 1893, p. 184.

Museum measures 8 inches in length and  $\frac{1}{8}$  inch in breadth, even after preservation in spirit. I propose for it the varietal name *australis*, but it comes very near to *G. testacea*.

5. *Geoplana splendens*, sp. n.

When at rest very broad and flat, when crawling convex above and flat beneath. Dorsal surface with three emerald-green stripes alternating with four rather broader dark brown stripes, and with narrow pale grey margins. Ventral surface pale purplish grey without stripes. Peripharyngeal aperture near the middle of the body, and the genital one about halfway between it and the posterior end.

This very handsome species was found at Jackson's, west of the Otira Gorge, in the South Island.

6. *Geoplana gelatinosa*, sp. n.

When at rest the body is very broad, flat, and extremely thin, with crinkled edges. The dorsal surface is dark olive-brown, with irregular rounded splotches of a lighter colour, like the knots in wood, and also with small whitish specks.

The colour and markings of the worm formed a close imitation of the piece of wet rotten bark on which it lay, and on which it appeared like a mere slimy patch. The ventral surface is light yellowish brown, finely speckled with dark brown. The peripharyngeal aperture in spirit is well behind the middle (but in the middle third) and the genital one about halfway between it and the posterior end.

The thin translucent character of the body in this species is very remarkable for a terrestrial Planarian.

Locality same as last.

7. *Geoplana Marieæ*, sp. n.

This species closely resembles the Australian *G. Fletcheri* and the Tasmanian *G. Mortoni*. The characteristic shape of the body is the same in all, and in all the ground-colour is yellow, with more or less well-developed brown speckles. In the present species there are no continuous longitudinal stripes of brown, but the dark specks are closely aggregated on either side of a narrow mid-dorsal band to form a pair of ill-defined dark bands. The pale yellow ventral surface is also speckled with brown. The position of the apertures is much the same as in *G. Fletcheri*.

Locality same as last.

8. *Geoplana Laingii*, sp. n.

When crawling about 3 inches long and  $\frac{1}{5}$  inch broad; much flattened below and ridged on the dorsal surface, so as to be triangular in cross section; tapering gradually in front and behind. Slimy and sticky as usual, but with the dorsal surface minutely rugose or warty (granulated). When at rest short and thick, slug-like. External apertures very far back. Dorsal surface yellowish brown, finely mottled with a darker tint of the same. In the mid-dorsal region is a narrow band of dull orange, divided into two by a very fine median line of darker brown, and edged on each side by a fine black line. Anterior tip pinkish. Ventral surface pale yellow, finely mottled with pale brown.

This species was found under stones at the foot of Lake Taupo in the North Island by Mr. R. M. Laing.

9. *Geoplana Graffi*, sp. n.

Body when at rest very broad and flat and rather abruptly pointed at both ends. Under surface very flat; upper surface sloping up on each side to a median longitudinal ridge, so that the body is obtusely triangular in section. When crawling long and narrow and more oval in section, narrower in front than behind. Attains a length of about 2 inches when crawling. The greater part of the dorsal surface is very dark purplish brown, sometimes nearly black in colour. Along the median ridge is a narrow band of much paler tint, in which fine irregular longitudinal stripes or marblings of greenish, bluish, or brownish tint may appear. Usually the lateral margins of the dorsal surface are occupied each by a narrow band of paler brown. The whole dorsal surface is flecked with small specks and dashes of pale greenish blue, clearly visible to the naked eye, and giving the animal a very handsome appearance. The ventral surface is of a somewhat paler brown than the dorsal, with a still paler median band and margins. It is flecked all over with very minute specks of whitish or very pale blue, and may have a finely marbled appearance. In spirit the dorsal surface is strongly convex and the ventral flattened, and the anterior end abruptly narrowed. The peripharyngeal aperture is about central, and the genital about halfway between it and the posterior extremity.

This species is very common in gardens about Christchurch, and I have also received it from Dunedin and Ashburton.

10. *Geoplana subquadrangulata*, sp. n.

In shape, size, and general coloration this little Planarian closely resembles the Victorian *G. quadrangulata* and *G. ventropunctata*. In some respects it appears to connect these two species; and I am very doubtful whether all these three should not be considered as mere varieties of the same. The chief distinguishing feature of the New Zealand form is the presence of three well-marked stripes of dark brown on the dorsal surface, one very narrow median stripe and a pair of much broader ones.

The lateral and ventral surfaces may or may not be mottled with dark brown, and thus we have two varieties of the New Zealand form corresponding to the Victorian *ventropunctata* and *quadrangulata* respectively; but these two varieties are in New Zealand connected by intermediate forms, and occur mixed up together in the same localities.

The species is very common at Christchurch, Ashburton, and Dunedin, while at the Bluff, in the extreme south, I found what seems to be another variety of the same with three dark stripes on each side of the mid-dorsal stripe.

11. *Geoplana inaequalistriata*, sp. n.

The body in life is flat ventrally and convex dorsally. When fully extended (about  $2\frac{1}{2}$  inches in length) it is long and narrow and tapers gradually to each end. The dorsal surface is dark brownish grey, with streaks of pale dull yellow arranged as follows:—a narrow median stripe continuous from end to end; on each side of this comes an uninterrupted band of the dark grey, occupying about one quarter of the total width of the dorsal surface. The outer quarter of the width on each side is also of dark grey ground-colour, but is interrupted by long, narrow, discontinuous, overlapping stripes of pale yellow. Towards the lateral margins the yellow comes to preponderate over the grey, and thus appears to form the ground-colour. The anterior extremity is pink. On the ventral surface the yellow colour predominates, and thus forms the ground-colour, which is streaked with irregular, discontinuous, narrow, close-set stripes of dark brown. A very narrow band on each side of the ventral surface is free from the dark streaks. The pharyngeal aperture in spirit is a little behind the middle, and the genital much nearer to it than to the posterior end.

I found this worm on the asphalt path in my garden near Christchurch.



12. *Geoplana sulphurea*, Fletcher and Hamilton, var.

Two specimens collected by Mr. Thomas Steel at Albert Park, Auckland, differ from the common New South Wales form only in the presence of minute specks of brown scattered over the yellow ground-colour, between the inner and outer dark brown stripes on the dorsal surface.

13. *Geoplana caerulea*, Moseley, var.

Mr. Steel also collected at Albert Park, Auckland, three specimens of the blue-tipped variety of this species, indistinguishable from those found in gardens near Melbourne, and probably introduced. Messrs. Fletcher and Hamilton originally recorded this blue-tipped variety from Sydney. It has never been found in the native bush, so far as I am aware, and appears to have been widely distributed by man's agency.

14. *Geoplana purpurea*, sp. n.

It is perhaps doubtful whether this species ought to be separated from the Australian *G. caerulea*, from which it differs only in colour. The body when crawling is long and slender, tapering very gradually at each end, with strongly convex dorsal and not very much flattened ventral surface. The ground-colour of the dorsal surface is rather dark reddish purple, interrupted only by a very narrow median band of nearly white. The anterior tip is paler, pinkish. The ventral surface is paler purple, under a lens appearing very finely mottled in two shades. In spirit the peripharyngeal aperture is about central, and the genital at about one third of the distance from it to the posterior extremity.

I have received three specimens of this worm from Ashburton, in the South Island, obtained for me by Mr. Fooks and Mr. Mayne.

15. *Rhynchodemus Moseleyi*, Fletcher and Hamilton.

*Rhynchodemus Moseleyi*, Fletcher and Hamilton, Proc. Linn. Soc. N. S. W. vol. ii. 1887, p. 371.

With this species I identify a number of small specimens of *Rhynchodemus* collected by Mr. T. Steel at Albert Park, Auckland. It is quite possible that the species has been introduced with plants, and we cannot yet say with certainty that the genus *Rhynchodemus* is indigenous in New Zealand.

16. *Bipalium kewense*, Moseley.

*Bipalium kewense*, Moseley, Ann. & Mag. Nat. Hist. ser. 5, vol. i. p. 238.

This widely distributed Land-Planarian was also found at Albert Park, Auckland, by Mr. Steel.

[Captain Hutton informs me that the record of *Bipalium* in his essay on the New Zealand fauna\* was based upon a mistake for which he is not responsible.]

*Observations on a new Land-Nemertine.*

*Geonemertes novæ-zealandiæ* is at present known only from two spirit-specimens which I found among collections of Land-Planarians given to me for investigation by Captain Hutton and Mr. Suter. One of the two specimens was collected at Toi-Toi, Southland, by Miss Rich; the exact locality of the other is unknown, but it is very likely that it came from the same place. Both specimens exhibited a characteristic and identical arrangement of alternate dark and light longitudinal bands on the dorsal surface, although the colour of one was much faded. In the fresher-looking specimen the light bands were very pale yellow and the dark bands deep chocolate-brown. The arrangement of the bands is as follows:—(1) A broad median light band; (2) a dark band of about the same width on each side of the median band; (3) a narrower light band outside the last; (4) a very narrow band of dark brown at the junction of the dorsal and ventral surfaces. The ventral surface is pale yellow.

In shape and size the specimens closely resemble the Australian *Geonemertes australiensis*. The larger of the two specimens measures nearly an inch in length in spirit, without the proboscis.

The mouth opens into the rhynchodaemum, as in *G. australiensis*.

Lateral organs, with cephalic pits, are present in the usual position.

A cephalic gland is present, as in *G. australiensis*.

I could find only four eyes, situated on the rounded anterior extremity of the body. Two of these are much larger than the other two, and lie more ventrally and a little more anteriorly. In the number of eyes the New Zealand species

\* Trans. N. Z. Institute, vol. v. 1872, p. 23. Quoted by Moseley in the Qu. Jour. Micr. Sci. vol. xvii. n. s. p. 275.



differs markedly from the Australian one, and conforms to the more usual type amongst Land-Nemertines.

The stylets and their arrangement closely resemble those of *G. australiensis*; in the specimen examined I have detected four reserve-sacs.

The sexes are probably distinct, for in the specimen of which I cut sections I can find only eggs.

*Observations on a Variety of Peripatus novæ-zealandiæ  
with Sixteen Pairs of Legs.*

Having received from Mr. Suter three specimens of supposed *Peripatus novæ-zealandiæ* from Stratford, in the North Island, I was greatly surprised to find on examination that all of them had sixteen pairs of claw-bearing legs. I have carefully compared the specimens with the usual form (with fifteen pairs of legs) obtained from both the North and South Islands, and can find no other points of difference, the coloration and the structure of the feet and jaws agreeing closely.

It is well known that the number of legs in the Australasian species of *Peripatus* is usually constant, although in some other species it varies. I therefore think the three specimens under consideration should be regarded as belonging to a distinct local variety, for which I propose the name *Peripatus novæ-zealandiæ*, var. *Suteri*.

It is interesting to note that the genital aperture in the new variety is still between the legs of the last pair (the sixteenth) and that the special nephridial apertures are on the legs of the fourth and fifth pairs as usual.

Christchurch, New Zealand,  
September 1894.

LI.—*Dimorphism in the Miliolinæ and in other Foraminifera.* By Prof. T. RUPERT JONES, F.R.S., F.G.S.

IN 1826, when revising the work of previous authors, Alcide D. d'Orbigny (Ann. Sci. Nat. vol. vii. pp. 297-304) placed various forms which had been included by earlier observers in the generic terms *Miliola*, *Miliolites*, *Serpula*, *Vermiculum*, and *Lagena* into six genera, which he called *Biloculina*, *Spiroloculina*, *Triloculina*, *Articulina*, *Quinqueloculina*, and *Adelosina*, concluding that the definite external segmentation of the test was of real generic importance.

In 1858 W. C. Williamson, in his 'Recent Foraminifera of Great Britain' (Ray Society), united three of these